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ABSTRACT

This discussion focuses on reading problems arising when bilingual children must learn two different scripts, and how the nature of the relationship between the two scripts may influence the child's ability to transfer and develop reading skills. First, models of normal and abnormal reading in English are described. The significance of these models for understanding the reading processes for other writing scripts, such as Malay and Chinese, are then considered. Data from a case study of a biscriptal Chinese/English-speaking boy with reading problems in English are then presented and explained with reference to the dual route reading model. The paper concludes by reviewing possible implications for educational assessment and reading remediation in the context of Singapore's predominantly bilingual, biscriptal primary school population. (Author/MSE)

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LANGUAGE TESTING IN SINGAPORE: A COGNITIVE APPROACH [1]

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SUMMARY

There are four official languages in Singapore - English, Mandarin, Malay and Tamil. Most children are educated in English language schools but are expected to be competent in at least one of the other languages. The nature of the relationship between the writing scripts of the two languages being learned is likely to influence the child's ability to transfer and develop reading skills. This paper is an exploratory study of the cognitive strategies that might to differentiate good biscriptal from poor biscriptal readers. The educational implications for assessment and teaching are discussed.

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INTRODUCTION

Oral reading is a complex skill encompassing several abilities: visual analysis, memory, comprehension, naming and speech. It is now a popular area of study for cognitive psychologists with a growing range of converging experiments. These include reaction time investigations with groups of normal adult readers, (Morton 1979; Seidenberg 1985), single case studies of developmental and acquired dyslexics, (Coltheart, Patterson and Marshall 1980; Patterson, Coltheart and Marshall 1985; Seymour and Macgregor 1984) and computer simulations of the reading process, (Seidenberg and McClelland 1989) have enabled psychologists to develop information processing models of reading.

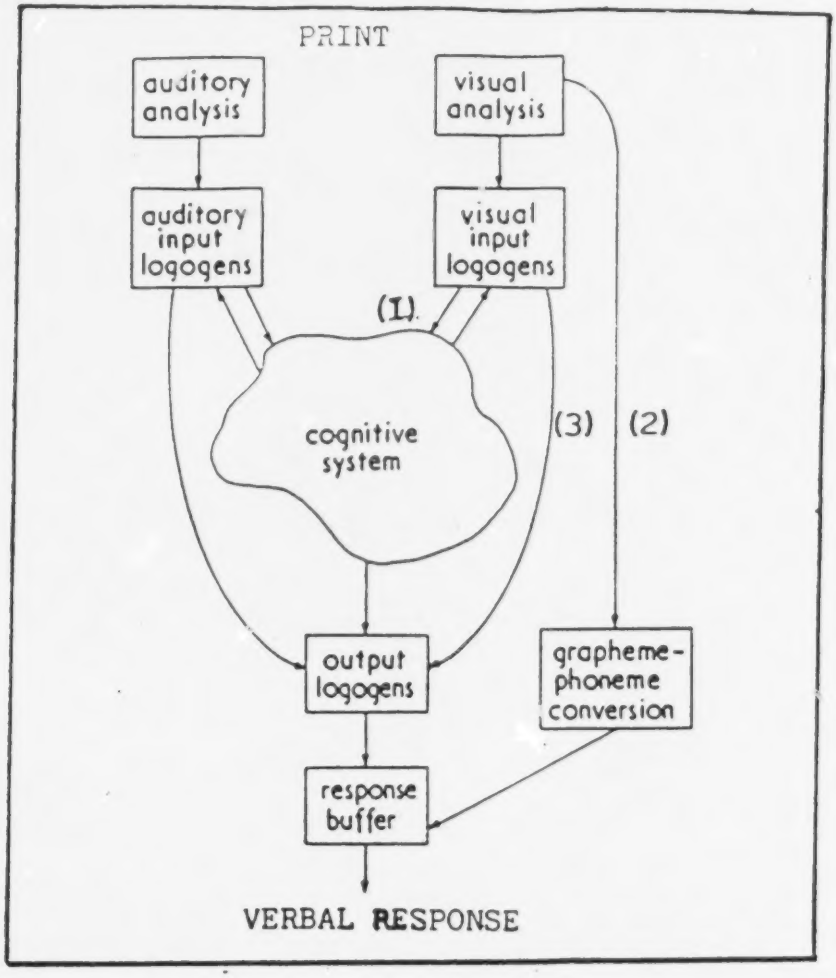
This paper first describes these models of normal and abnormal reading in English. The significance of these models for understanding the reading processes for other writing scripts, such as Malay and Chinese, are then considered. Data from a case study of a biscriptal Chinese/English speaking boy with reading problems in English are then presented and explained with reference to the dual route reading model. The paper concludes by reviewing possible implications for educational assessment and reading remediation in the context of Singapore's predominantly bilingual, biscriptal primary school population.

A MODEL OF NORMAL READING

There are many tasks that must be accomplished by the competent reader before print can be converted to sound. Letters must first be identified as letters and then recognised in each of their different forms - upper and lower case, different handwriting scripts and typefaces, (**A:a, R:r, G:g**). The reading system must also be able to recognise the sequence of the letters as well as their presence, (**bad:dab, god:dog**). In order to do this it seems that some kind of memory device is required which retains a representation of the word and allows it to be recognised each time it is presented. Once the sequence of letters is recognised as a familiar word, the system must then be able to locate the relevant semantic information. In silent reading the task is complete once the reader has accessed meaning but if the word is to be read aloud the system must also be able to produce the appropriate speech sounds.

Pre-theoretical reasoning of this kind allowed the construction of models of reading (Morton 1979, Morton and Patterson 1980), and from these models testable research hypotheses have been generated. In such models, (see Figure 1 for example), input logogens constitute word recognition units and the output logogens are word production units. Each logogen has its own threshold which determines the degree of excitation needed before it activates

subsequent processing. The threshold appears to be affected by the word's frequency (high frequency = low threshold), context (reader's expectancies) and the time lapsed since previous stimulation (recent firing = lower threshold).



Key to Routes: (1) Semantic (2) Phonological (3) Direct

Figure 1 shows a version of Morton's Logogen Model

Once the logogen has been activated there appears to be several options: information is either sent to the cognitive system and thence to the output logogens (Route 1, the semantic route), or information is sent directly to the output logogen system (Route 3, the direct route). A third option for achieving a phonological code (Route 2, the phonological route) does not involve the logogen system. In place of holistic processing the word is treated as a series of graphemes, or higher order units, (see Patterson, Marshall and Coltheart 1985), which are converted by rule into a phonological code. Evidence for the direct route is rather tenuous and so most researchers have assumed a dual route model comprising the complementary functions of the semantic and phonological routes.

MODELS OF ABNORMAL READING

Models of normal reading have been used to explain several different patterns of reading deficit in brain damaged adults and developmental dyslexics. The contrasting reading disorders called surface dyslexia and phonological dyslexia have served as clear illustrations of the component skills, [see Coltheart (1982) or Ellis (1984) for more detailed descriptions].

Surface dyslexics appear to depend heavily upon a regular relationship between orthography and phonology. For some languages this strategy may be appropriate, for example Malay or Serbo-Croat,

but the English language is so irregular that many reading errors are likely to arise if route 2 alone is used. A typical corpus of surface dyslexic oral reading errors would include regularisations such as reading **sew** as "sue" and **bear** as "beer", and when asked to define these words the surface dyslexic is likely to say "a girl's name" and "a drink" respectively.

Phonological dyslexics show the reverse pattern. The main characteristic of this reading problem is an inability to assemble phonology non-lexically. Despite being able to read aloud many words perfectly, reading of even simple 3-letter nonwords (for example **bem, nep, dut**) is either very difficult or impossible. This difficulty with nonwords suggests deficits in route 2 (phonological) of the model shown in Figure 1, and over reliance on route 1 (semantic).

Being unable to make use of the relationship between graphemes and phonemes is problematic for beginner readers (and spellers) of alphabetic scripts who are trying to tackle new words. Without the benefit of grapheme-phoneme rules, these young readers are obliged to rote-learn literacy skills. For readers of logographic scripts, such as Chinese or Japanese (kanji), rote learning is a necessity, but for alphabetic scripts, such as English, the strategy is unnecessarily effortful and very error prone. In spelling, the subject may learn the word's constituent letters but often cannot self-correct mistakes when letters are written in the wrong

sequence.

WRITING SCRIPTS AND READING DEVELOPMENT

Clearly the nature of the writing script will determine the component skills for proficient reading, (see Henderson 1982 for a review). For readers of English, Frith (1985) and others have identified three stages in the development of reading skills for (monolingual) children, see Table 1. The sequential nature of such stages has recently been questioned by Stuart and Coltheart (1988), but classification of the processing skills is nevertheless useful. Clearly the logographic stage may have much in common with the processing skills required for reading Chinese. While readers of Malay may or may not begin with a logographic stage, the alphabetic stage represents the cognitive abilities demanded by the regularly spelled Malay script.

For mature, adult reading in English, the orthographic stage must be reached but in this paper it is argued that some bilingual readers may adopt inefficient or error prone strategies when they are learning to read because of the influence of the script of their first language: Chinese/English readers may rely too heavily upon the semantic route (as with phonological dyslexics) and Malay/English readers may depend too heavily upon the phonological route (as with surface dyslexics).

READING STAGE	CHARACTERISTIC PROCESSING
I Logographic	Child has impressive sight vocabulary; uses look-say strategy
II Alphabetic	Phoneme awareness develops; child uses rule-based decoding strategies
III Orthographic	Recognises many words do not obey rules; combines strategies and may also use morphological knowledge

Table 1 Hypothetical stages of reading development

The effect of the first language (Chinese or Malay) on the acquisition of reading skills in the second language (English) was investigated by Nga (1989). She found that on tests of reading and spelling in English, Malay/English bilinguals scored consistently higher than Chinese/English bilinguals when the two groups were matched for age, class position, and school language examination results. These findings, which were discussed with reference to the dual-route model of reading, lent support to the hypothesis

that the compatibility of the two writing scripts in terms of the relationships between their orthography and phonology, may affect reading efficiency or accuracy in one or both of the languages concerned.

The following detailed case study of a 12 year old Chinese/English boy with reading problems in English does not constitute evidence that such problems are widespread. The boy was simply identified as one of the poorest readers in his school year group during the screening stage of a group study. His case does, however, illustrate the kind of difficulties that some biscriptal children might face within a theoretical framework. Furthermore, it does suggest that a cognitive approach to language testing might contribute significantly to the development of appropriate teaching and remediation strategies.

READING PROBLEMS IN BILINGUAL BISCRIPTAL CHILDREN: A CASE STUDY

A systematic cognitive assessment demonstrated that the boy's reading problem could be attributed to deficient phonological processing, rather than limited exposure to English or below average intellectual functioning. This kind of deficit, usually referred to as phonological dyslexia, is evident in monolingual English-speaking children (see Temple and Marshall 1983 for example), and in milder forms it may be relatively common amongst

biscriptal children whose first spoken language, like Chinese, has a rather opaque relationship between its orthography and phonology. The possibility of the converse English reading problem, surface dyslexia, (see Coltheart et al 1983) existing amongst bilinguals where the relationship between orthography and phonology of the first language is transparent (such as Malay) awaits further investigation.

Background

J.Y. (the boy) was found to be a very poor reader of English during the screening stage of Nga's (1989) group study of normal Primary 6 bilingual readers in a government school. The Schonell Graded Word Reading Test results (see Table 2) suggested that his reading age lagged more than two years behind his chronological age (only British Norms available):-

J.Y.'s Score: 36/100

Reading Age: 8:6 years **Chronological Age:** 12:10yrs

Table 2 Results of the Schonell Graded Word Reading Test

An intelligence test and a series of diagnostic tests were administered and interpreted from a cognitive perspective. The results (summarised below) confirmed that J.Y.'s difficulties were specific to reading. When his scores on specially constructed reading and spelling tests were considered within the framework of

an information processing model of reading it seemed clear that J.Y.'s difficulties were phonological in nature. Recommendations for remediation consistent with this finding were then made.

TEST RESULTS AND INTERPRETATION

Language Competence J.Y. was first asked to rank order his language competence for speaking and writing. The results are shown in Table 3.

	Rank Order		
	1	2	3
Speaking	Mandarin	Dialect	English
Writing	English	Chinese	

Table 3 Self-reported competence in Chinese and English

J.Y is more competent in Chinese for conversation since this is the language used at home, but prefers English for writing and studying at school. This discrepancy between language at home and language at school is common amongst J.Y.'s classmates and other Singaporean Chinese children who are being educated in English. Alone, therefore, it cannot account for his relatively poor reading performance. J.Y.'s score on the British Picture Vocabulary Scale (Long Form) with auditory presentation confirmed that language exposure per se was not a major problem, (see Table 4). This test has not been standardised or normed for Singaporean

children, but it seems that J.Y.'s vocabulary age was much closer to his chronological age than was his reading age (as judged from the performance of monolingual British children). Although his score only put him at the 37th centile, (again for monolingual children), it was well above the average range for his peer group.

J.Y.'s score: 106 **Centile for Age:** 37

Vocabulary Age: 11:10 years **Chronological Age:** 12:10 years

Table 4 Results of the British Picture Vocabulary Scale

Intelligence Language exposure had been ruled out as a sufficient reason for a severe reading problem in English, but to ensure that J.Y.s difficulties were specific to reading, it was important to gauge his intellectual level. The British Ability Scales was chosen for this purpose and the results are shown in Table 5. Again, norms are only available for British children but the pattern of scores allows a judgement to be made about J.Y.'s reading ability in relation to his other cognitive skills. From these results it was also clear that his overall intellectual functioning is probably above average.

	%ile
SPEED	
Information Processing	99+
REASONING	
Matrices	53
Similarities	57
SPATIAL IMAGERY	
Block Design Level	75
Block Design Power	78
SHORT TERM MEMORY	
Immediate Visual Recall	23
Delayed Visual Recall	20
Recall of Designs	88
KNOWLEDGE	
Number Skills	90
Word Reading ➡	5
Word Definitions	22

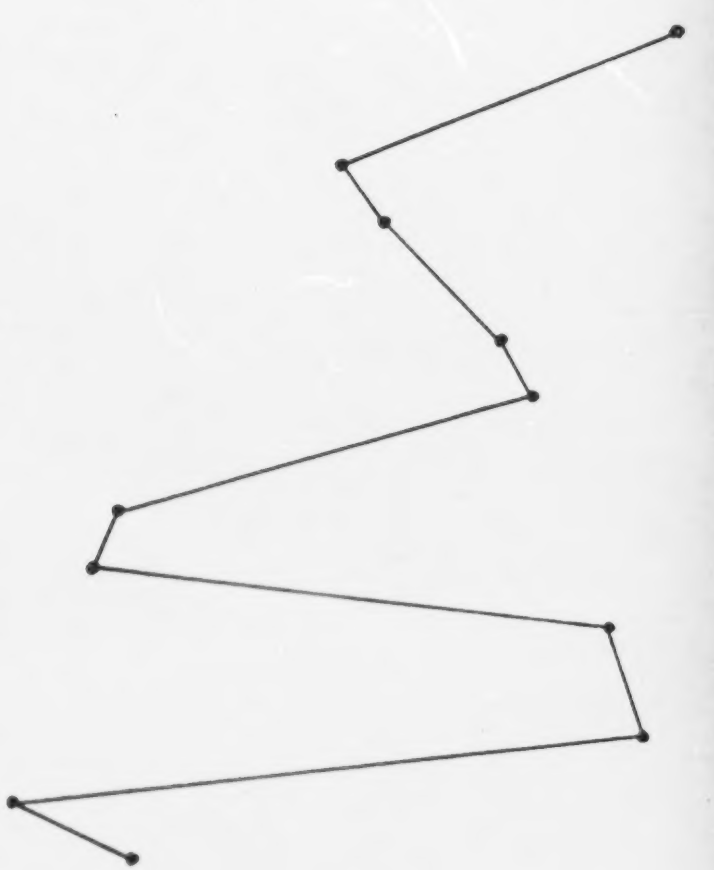


Table 5 Pattern of centile scores on British Ability Scales

IMPORTANT: Extreme care must be taken in interpreting the results of BAS as this test has NOT been standardised or normed for Singapor children. Focussing attention on the pattern of scores is likely to more helpful than examining absolute values, which for the most part probably underestimations of J.Y.'s ability.

Diagnostic Reading and Spelling Tests

Regular/Irregular Words: This test, devised by Coltheart (1980), comprises sets of regularly and irregularly spelled words at different levels of word frequency, (see examples in Figure 5). Norms are not yet available in Singapore, but the pattern of scores for J.Y. shown in Figure 5 suggests that spelling regularity has little effect on his performance. If he were using a phonological route effectively either for sounding out unfamiliar words in reading or guessing spellings, J.Y. would be expected to show an advantage for regular over irregular words. In fact there is no difference in his performance for reading aloud regular and irregular words and, curiously, he shows a small advantage for irregular words in spelling. The results suggest that J.Y.'s phonological ability warranted further investigation.

WORD FREQUENCY	READING		SPELLING	
	Regular	Irregular	Regular	Irregular
Low	4/13	5/13	0/13	2/13
examples:	shampoo	subtle	grill	trough
Medium	9/13	7/13	3/13	5/13
examples:	plug	flood	treat	aunt
High	11/13	12/13	5/13	6/13
examples:	fresh	love	take	gone
TOTALS	24/39	24/39	8/39	13/39

Table 6 Results of Coltheart's Regular/Irregular Word Tests

Phonology: J.Y.'s phonological abilities were tested in three ways. First, in a **Letter Sounding** he was asked to produce the sounds of 24 lower case letters. He sounded only 10/24 correctly. His errors included letter names and some incorrect sounds.

Second, he was given a **Nonword Reading** task. The test comprised simple nonwords such as "hile", "nain" and "rabe". J.Y. found the task puzzling and very difficult. He read only one nonword correctly ("zoul"); an item that was probably amenable to visual approximation (soul). Errors included incorrect neologisms and

real words.

Finally, Coltheart's (1980) tests of **Silent Phonology** were administered to check that J.Y.'s phonological problem was not simply articulatory. This test consists of pairs of homophonic and nonhomophonic letter strings which are either nonwords, regular words or irregular words. The subject's task is to read silently and sort the cards (N=150) into two piles according to whether the pair of letter strings sound alike or not. The results, shown in Table 7, show that J.Y.'s performance is at chance for nonwords (ie he cannot judge when two nonwords sound alike), and rather poor for both regular and irregular words. His phonological deficit is not restricted to oral reading.

	TYPE OF LETTER STRING		
	Regular	**Irregular**	**Nonwords**
Correct	33/50	29/50	24/50
False Alarms	13	14	14
Misses	4	7	12

Table 7 Results of Coltheart's Silent Tests of Phonology

Semantic Route Reading?

J.Y. seemed to be reading largely without the aid of phonological processing. As this strategy is reminiscent of logographic reading, the following observations with respect to semantic route

reading are worthy of report.

Of the 100 items on the Schonell Graded Word Reading Test, J.Y. read only 36 words correctly. He read only 3 words incorrectly and made no attempt to read aloud the remaining 61 words. He was, however, prepared to give brief definitions to words he could not read aloud. His definitions were indicative of approximate semantic access without phonology, (see Table 8), and included words well above his reading level.

Reading Errors (x3)

angel -> angle

appeared -> appearment

disposal -> dispose

Word Definitions

audience -> "like someone watching football match"

choir -> "group of people playing instruments"

recent -> "long time ago didn't go to see him"

genuine -> "really things"

institution -> "like a school"

conscience -> "you faint it then" (also pointed out the word consisted of con + science)

heroic -> "like a hero"

preliminary -> "thinks"

antique -> "something don't have; it is very special"

sabre -> "like a sword"

fictitious -> "like fiction"

Table 8 Error Corpus and Word Definitions for the Schonell

Recommendations for Remedial Work

First and foremost, a professional audiological assessment (including typanography as well as pure tone audiometry) was recommended for J.Y. Children with phonological problems often turn out to have long-standing untreated ear infections or hearing deficits, Quin and Macauslan (1988).

Second, whether or not the difficulty can be traced to a history of hearing problems, J.Y. is likely to benefit from systematic phonics training such as Hornsby and Shear's (1980) "Alpha to Omega: the A-Z of Teaching Reading, Writing and Spelling". This programme has the advantage of being a highly structured phonetic, linguistic approach which follows the normal pattern of written language acquisition. It is particularly suitable for drawing attention to phonological as well as visual patterns. Homework practice is an integral part of the programme, but the primary source of help usually needs to come from a teacher or speech therapist who can offer regular one-to-one sessions.

Third, the progress of any remedial programme should be monitored. J.Y. should be re-tested at a suitable interval to ensure that his reading ability is catching up with the average for his age group.

DISCUSSION AND CONCLUSIONS

For many monolingual developmental dyslexics, the use of more efficient strategies is a realistic teaching goal. Cognitive

models of reading, such as the one illustrated in Figure 1, could be valuable tools for educational psychologists, speech therapists and teachers who are designing remedial reading programmes.

For biscriptal children with reading delay, such as J.Y., some of the difficulty may be traced to the incompatibility of the two writing scripts for transferring reading skills. Learning Hanyu Pinyin may promote phonological awareness for some children but others may find it confusing if they have not already established grapheme-phoneme rules for English. (Incidentally J.Y.'s reading of Chinese characters was about average when compared to that of his classmates.)

With script incompatibility, (Chinese/English readers), strategies for one (or both) languages may be less than optimal and may result in efficient and effortful reading. Given that independent reading later becomes the corner-stone of education, early remediation is essential if the child is to maximise his potential.

At the moment J.Y.'s intellectual functioning is above average despite a considerable reading handicap. In his case, at least, there is evidence of deficient phonological processing and an over-reliance on a logographic strategy. The problem might still be remediable.

In sum, although the lack of appropriate tests and norms for

Singaporean children makes this study speculative, it does seem that with a better understanding of cognitive processes in bilinguals, especially biscriptals, methods of teaching reading skills and reading remediation programmes might be substantially improved.

NOTES

1. This research is part of a project on bilingual reading being carried out by the author and Dr CHUA Fook Kee. The work was supported by a grant from the National University of Singapore (RP880024) and a generous donation from the Shaw Foundation (SF4/88). NGA Li Hong and ANG Wei Neng assisted with the data collection.

REFERENCES

Coltheart, M. (1980) Analysing acquired disorders of reading. Unpublished manuscript, Birkbeck College, University of London.

Coltheart, M. (1982) The psycholinguistic analysis of acquired dyslexias: some illustrations **Philosophical Transactions of the Royal Society, B298,** pp. 151-164.

Coltheart, M., Patterson, K & Marshall, J. (1980) (Eds) **Deep Dyslexia** London: Routledge and Kegan Paul.

Coltheart, M., Masterson, J., Byng, S., Prior, M. & Riddoch, M.J. (1983) Surface Dyslexia **Quarterly Journal of Experimental Psychology, 35A,** pp. 469-495.

Ellis, A.W. (1984) **Reading, Writing and Dyslexia: A Cognitive Analysis** London: Lawrence Erlbaum Associates

Frith, U. (1985) Beneath the surface of developmental dyslexia. In K.E. PATTERSON, J.C. MARSHALL & M. COLTHEART (Eds) **Surface Dyslexia** London: Lawrence Erlbaum Associates

Henderson, L. (1982) **Orthography and Word Recognition in Reading** London: Academic Press

Morton, J. (1979) Facilitation in word recognition: experiments causing change in the logogen model. In P.A. KOLERS, M. WROLSTEAD and H. BOUMA (Eds) **Processing of Visible Language** New York: Plenum Press.

Morton, J. & Patterson, K.E. (1980) A new attempt at an interpretation, or, an attempt at a new interpretation. In M. COLTHEART, K.E. PATTERSON & J.M. MARSHALL (Eds) **Deep Dyslexia** London: Routledge and Kegan Paul.

Nga, L.H. (1989) Effects of orthographic depth of a child's native

language (Malay/Chinese) on the processing of English. Unpublished manuscript, National University of Singapore

Patterson, K.E., Coltheart, M. & Marshall, J.M. (1985) (Eds) **Surface Dyslexia** London: Lawrence Erlbaum Associates

Quin, V. & Macauslan, A. (1988) **Dyslexia: What Parents Ought To Know** London: Penguin Books

Seidenberg, M. (1985) The time course of phonological code activation in two writing systems **Cognition, 19,** pp. 1-30.

Seidenberg, M.S. & McClelland, J.L. (1989) A distributed, developmental model of word recognition and naming **Psychological Review, 96,** pp.523-568.

Seymour, P.H.K. and MacGregor, C.J. (1984) Developmental Dyslexia: A cognitive experimental analysis of phonological, morphemic and visual impairments **Cognitive Neuropsychology, 1,** pp. 43-82.

Stuart, M. & Coltheart, M. (1988) Does reading develop in a sequence of stages? **Cognition, 30,** pp. 139-181.

Temple, C. & Marshall, J. C. (1983) A case study of developmental phonological dyslexia. **British Journal of Psychology, 74,** pp. 517-533.